REMARKS

The above amendment amends the specification to further update references to related patent documents. No new matter is added.

Claims 1-21 were pending in the above-identified application when last examined, and claim 12 is now being amended as indicated above. The claim amendment clarifies the claim language and is not intended to limit the scope of the claims.

Claim 12 was rejected under 35 U.S.C. § 112, second paragraph as being indefinite, particularly for reciting "the magnetic regions" without sufficient antecedent basis. In response, line 5 of claim 12 is amended to recited "the magnetic region", which has antecedent basis in line 2 of claim 12. In view of this amendment, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 112.

Claims 1-22 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-37 of U.S. Pat. No. 6,888,208 (the '208 patent). In response a terminal disclaimer to obviate the double patenting rejection is being submitted. In view of the terminal disclaimer, Applicants request reconsideration and withdrawal of the obviousness-type double patenting rejection.

Claims 1-21 were rejected under 35 U.S.C. § 102(b) as anticipated by Sankar Das Sarma, "Spintronics," American Scientist Vol. 89, pp 516-523 (2001), hereinafter Sarma. Applicants respectfully traverse the rejection.

Independent claim 1 distinguishes over Sarma at least by reciting, "a wire positioned relative to the control region so that a current through the wire creates in the control region a magnetic field that rotates spins of the electrons traversing the control region." Sarma fails to suggest electron spins interacting with a magnetic field produced by a current through a wire.

Sarma in Fig. 3 illustrates a spin transistor commonly known as the Datta-Das spin transistor. The Datta-Das spin transistor as illustrated in Sarma includes a ferromagnetic emitter and a ferromagnetic collector with a thin intervening channel. A gate voltage, e.g., gate V in Fig. 3, controls the flow of spin-polarized electrons through the channel. In particular, the caption of Fig. 3 in Sarma describes operation of the spin transistor as follows: "With the gate voltage off, the aligned spins pass through the channel and are collected at the other side... With the gate voltage on, the field produces magnetic

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OF DAVID MILLERS
6560 ASHFIELD COURT
SAN JOSE, CA 95120
PH: (408) 927-6700
FX: (408) 927-6701

interaction that causes the spins to precess... If the spins are not aligned with the direction of the magnetization of the collector, no current can pass."

The interaction that Sarma loosely refers to as being a magnetic interaction is actually a spin-orbit interaction that is commonly known as the Rashba interaction. Spin-orbit interactions arise when a particle with spin (e.g., an electron) moves through an electric field, for example, when an electron orbits through the static electric field of a nucleus or the spin-polarized electrons in the Datta-Das spin transistor traverse the electric field arising from an applied gate voltage. Despite Sarma's reference to a magnetic interaction, the gate voltage in the Datta-Das spin transistor only produces an electric field and does not produce a magnetic field. The weak spin-orbit coupling of the spin of the electron to the electric field (i.e., the Rashba interaction) rotates the spin of an electron. Accordingly, Sarma fails to disclose or suggest "a current through the wire creates ... a magnetic field that rotates spins of the electrons" as recited in claim 1 because the spin transistor Sarma discloses relies on spin-orbit interactions and employs a gate voltage (not a current) to create an electric field (not a magnetic field). Claim 1 is thus patentable over Sarma.

Claims 2-11 depend from claim 1 and are patentable over Sarma for at least the same reasons that claim 1 is patentable over Sarma.

Independent claim 12 distinguishes over Sarma at least by reciting, "a magnetic wire; ... and a control region forming a first interface with the magnetic wire ..., wherein ... a current along the magnetic wire creates in the control region a magnetic field that rotates spins of the electrons traversing the control region." In regard to the magnetic wire of claim 12, the Examiner cites the gate of the Datta-Das spin transistor. However, Sarma fails to disclose or suggest that the gate is a magnetic wire or forms an interface with a control region. Further for the reasons set forth above in regard to claim 1, Sarma fails to disclose or suggest "a current along the magnetic wire creates in the control region a magnetic field that rotates spins of the electrons traversing the control region" because Sarma discloses a device using a spin-orbit interaction that is commonly known as the Rashba interaction. Accordingly, claim 12 is patentable over Sarma.

Claims 13-21 depend from claim 12 and are patentable over Sarma for at least the same reasons that claim 12 is patentable over Sarma.

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102.

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SAN JOSE, CA 95120
PH: (408) 927-6700
FX: (408) 927-6701

In summary, claims 1-21 were and remain pending in the application. For the above reasons, Applicants respectfully request allowance of the application including claims 1-21.

EXPRESS MAIL LABEL NO:
EQ 159 111 684 US

Respectfully submitted,

David Millers
Reg. No. 37,396

THE PATENT LAW OFFICES
OF DAVID MILLERS
6560 ASHFIELD COURT
SAN JOSE, CA 95120
PH: (408) 927-6700
FX: (408) 927-6701